Special Session: Ecosystem Management Challenges for Defense Installations

Managing Ecosystems for Multiple Species of Concern

Rebecca R. Sharitz
Savannah River Ecology Laboratory
University of Georgia
sharitz@srel.edu

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Some southeastern TES on military lands

Smooth purple coneflower
(*Echinacea laevigate*)

Red-cockaded woodpecker
(*Picoides borealis*)

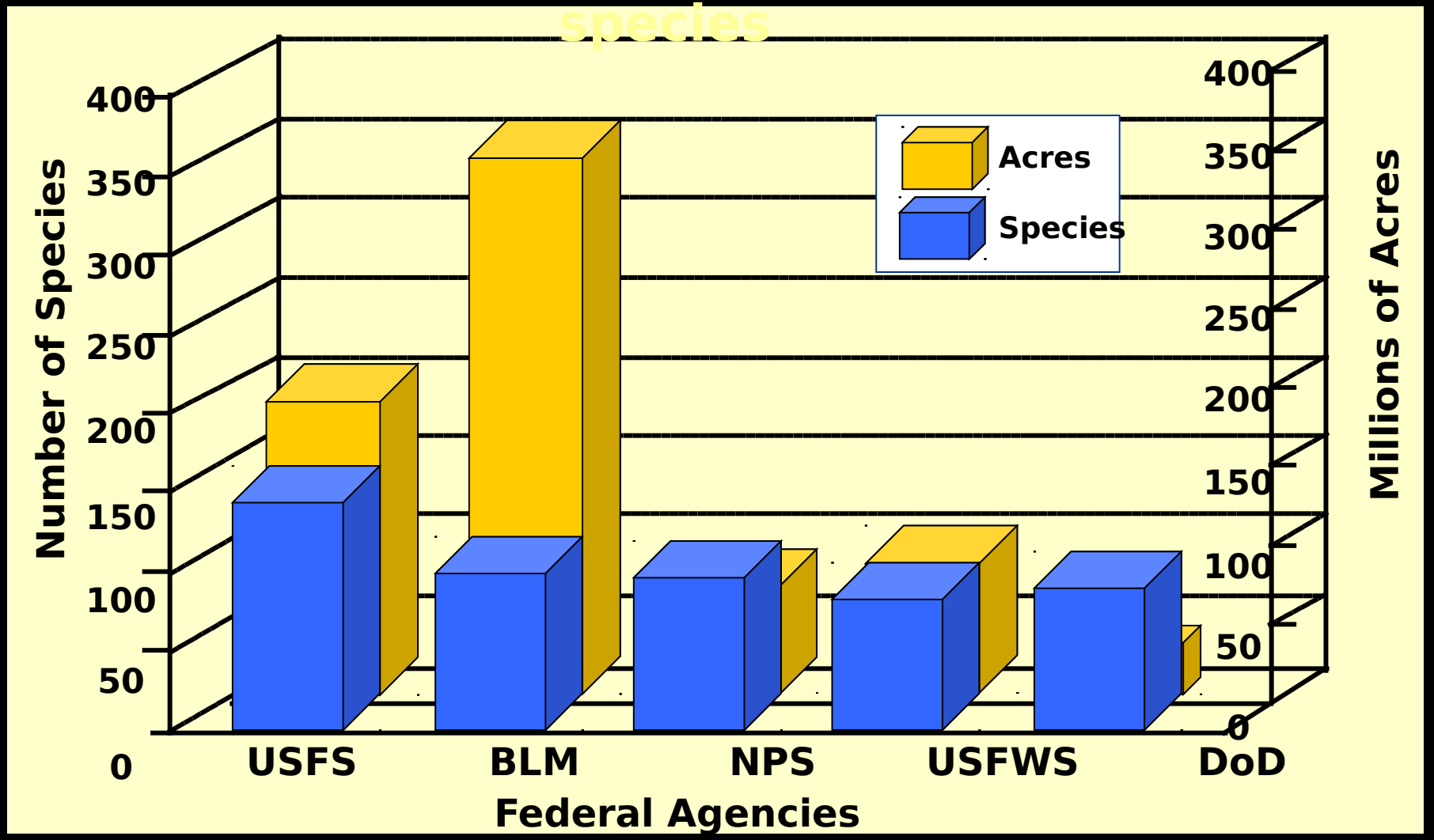
Pickering's morning glory
(Stylisma pickeringii)

Southern hognose snake
(Heterodon simus)

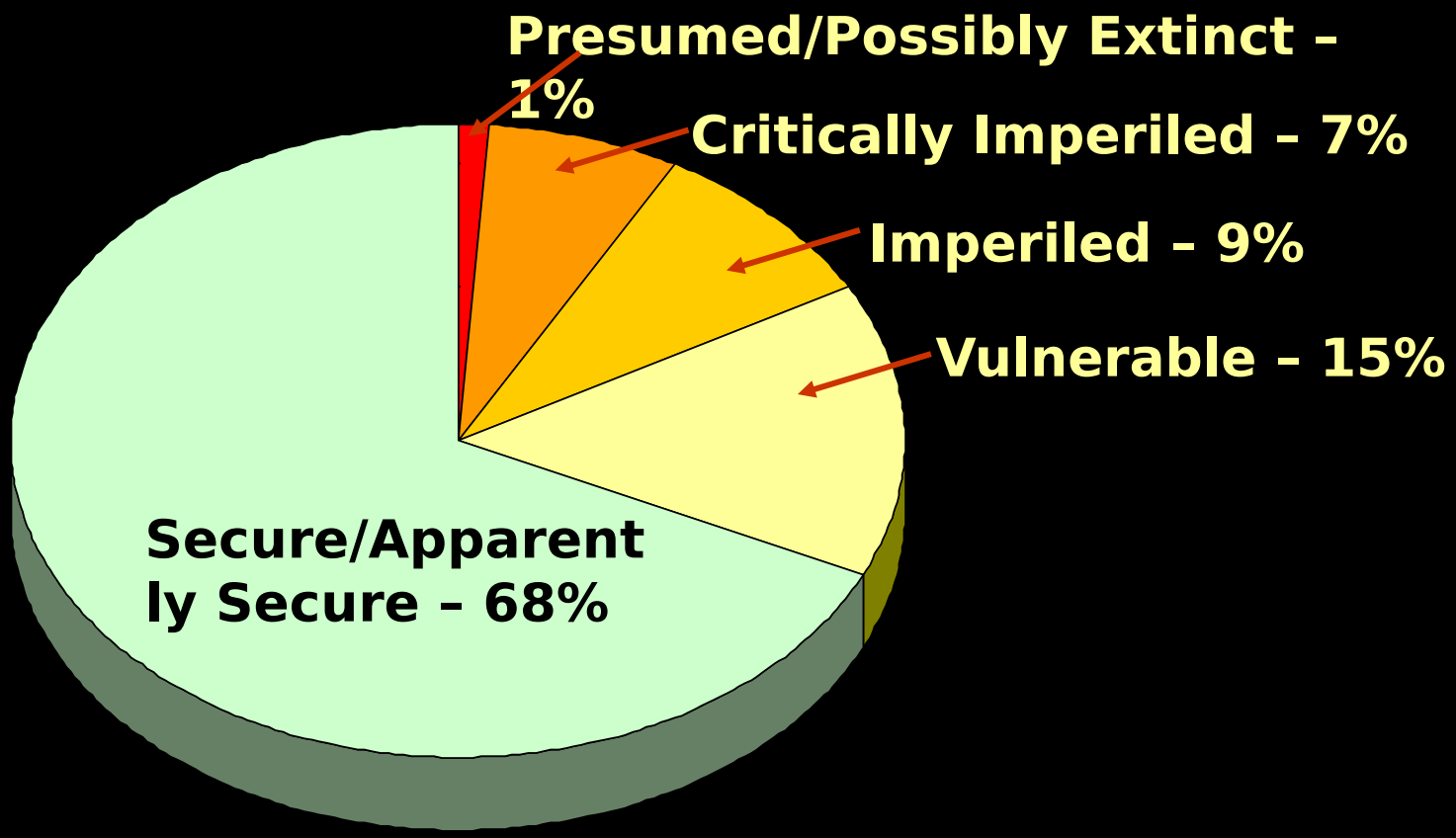
Wood stork
(*Mycteria americana*)

Gopher tortoise
(Gopherus polyphemus)

Department of Defense lands have a disproportionate number of federally listed species



- Leslie et al. 1996. ***Conserving Biodiversity on Military Lands***



U.S. species at risk of extinction

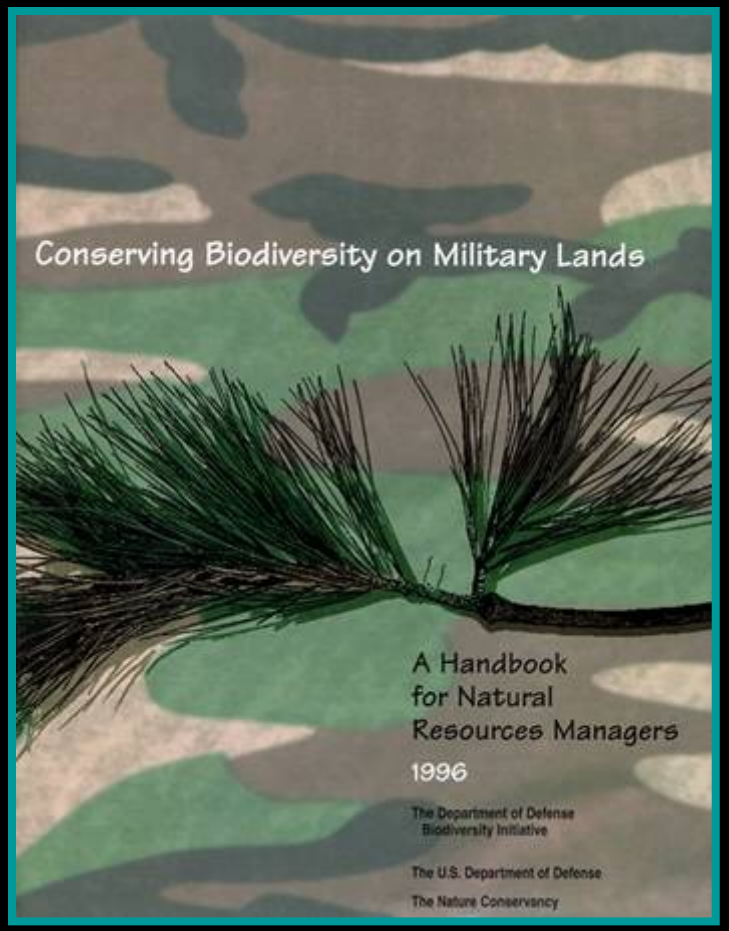
(The Nature Conservancy 1996)

Endangered Species Act of 1973

The purposes of this Act are to provide a means whereby the eosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species…..

For DoD this means TES management could become a greater concern:

- Number of species requiring protection will probably increase
- As military installations close and weapons systems become more sophisticated, demands for remaining military training grounds will increase
- There is pressure on all federal lands to assume increasing responsibility for protection of dwindling habitats and species



Ecosystem Management Goal

- Maintain viable populations of all native species *in situ*
- Represent, within protected areas, all native ecosystem types across their natural range of variation
- Maintain evolutionary and ecological processes (e.g., disturbance regimes, hydrological processes, nutrient cycles, and so forth)
- Manage over periods of time long enough to maintain the evolutionary and ecological processes (e.g., disturbance regimes, hydrological processes, nutrient cycles, and so forth)
- Accommodate human use and occupancy within these constraints

Elements of TES Management on DoD Lands

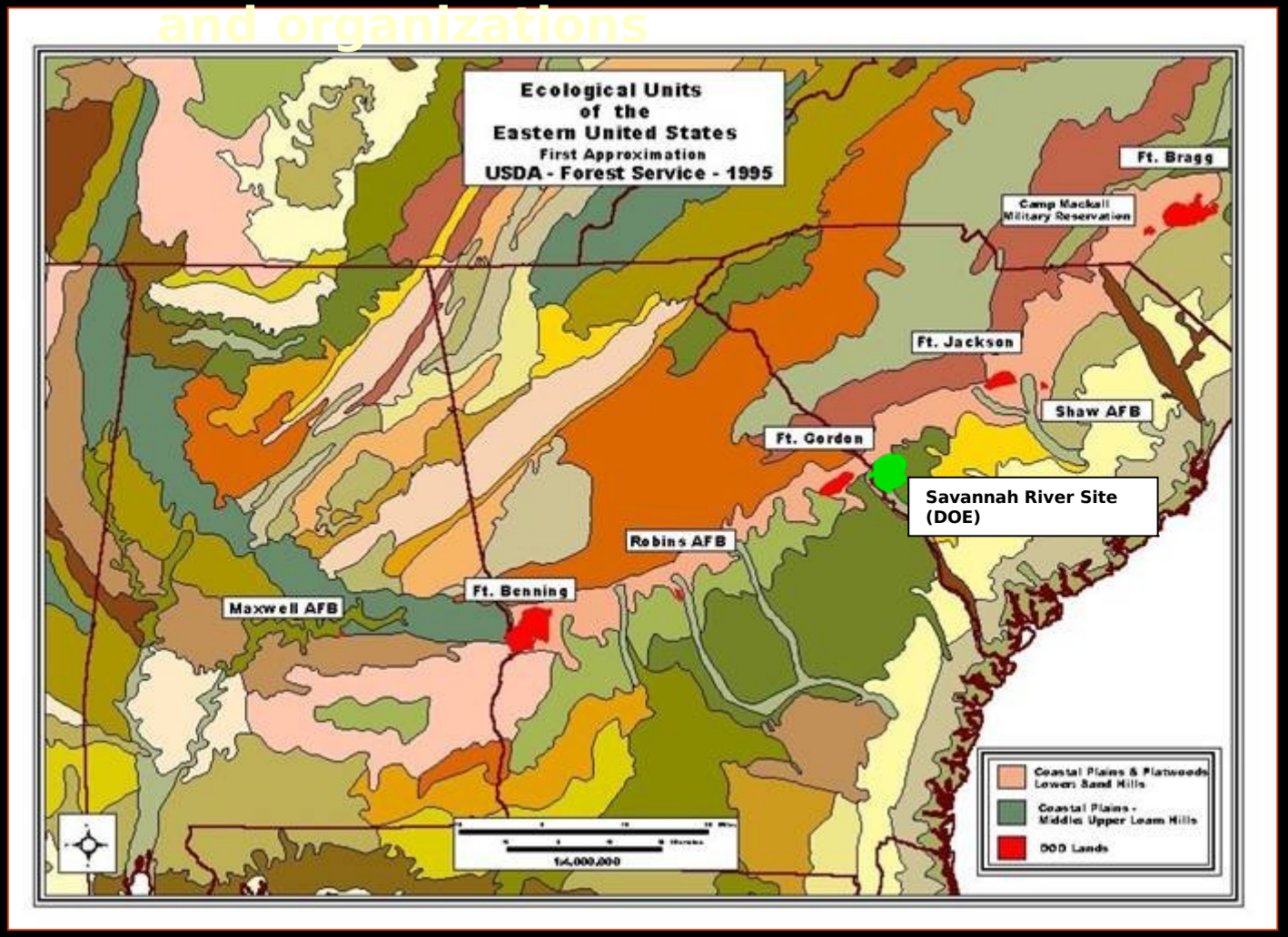
- multiple-species (or ecosystem) approach
- ecoregional planning – partnerships among agencies and organizations
- a case study – effects of single species management on other TES
- pose several questions for consideration

- **multiple-species (or ecosystem) approa**

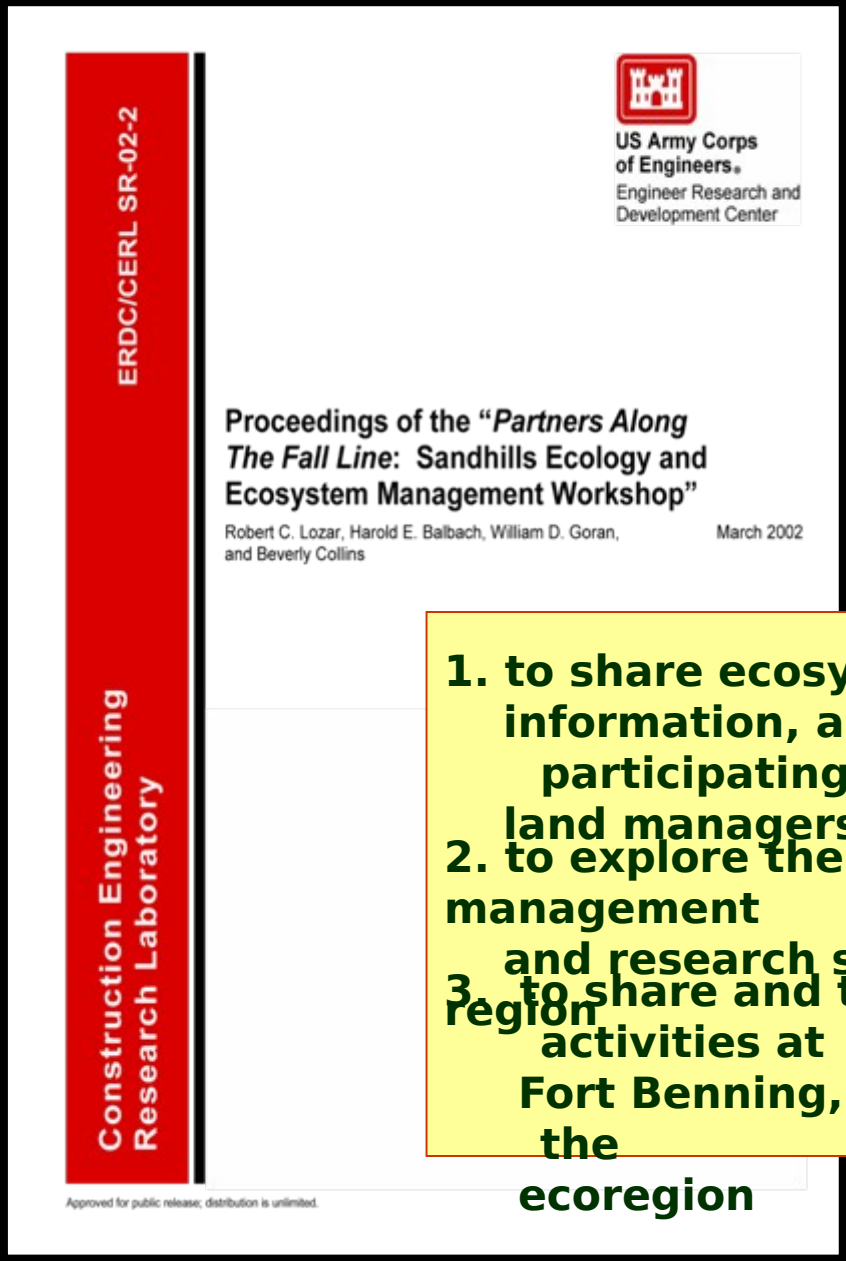
- Single species management is not up to the task of solving the larger problem of multiple disappearing species and degrading habitats.
- A single-species approach does not recognize the complexities and dynamic processes inherent in nature.
- Species require functioning and intact habitats in which to live, so management must ultimately deal with habitats and ecosystems.
- A single species approach does not adequately incorporate human dimensions into management solutions.

DoD is adopting an integrated, ecosystem-based approach to conservation that allows the military greater flexibility in managing its lands.

- ecoregional planning – partnerships among agencies and organizations



Department of Defense Installations Along the Fall Line Sandhills Ecoregion


ERDC/CERL SR-02-2
Construction Engineering Research Laboratory
US Army Corps of Engineers
Engineer Research and Development Center
Proceedings of the "Partners Along The Fall Line: Sandhills Ecology and Ecosystem Management Workshop"
Robert C. Lozar, Harold E. Balbach, William D. Goran, and Beverly Collins
March 2002
Approved for public release; distribution is unlimited.

SERDP SEMP Workshop

March 2001

Savannah River Site

1. to share ecosystem management approaches, information, and technologies among participating land managers

2. to explore the potential for ecoregional management and research strategies in the Fall Line sandhills region

3. to share and transition the results of SEMP activities at Fort Benning, GA, to other land managers across the ecoregion

Goal of the Southeastern Ecological Framework

Use a regional landscape approach to design a functional Ecological Framework that:

- **Identifies critical elements of native ecosystems and landscapes**
- **Maintains connectivity among ecological systems & processes**
- **Facilitates the ability of these ecosystems & landscapes to function as dynamic systems**
- **Maintains the ability of the ecosystems to adapt to future environmental changes**

Source: Neil Burns, EPA

Lands Along the Fall Line and Lower Piedm

areas in hectares

National Forests

Uwharrie	20,309
Sumter	147,596
Oconee	46,684

Military Bases

Ft. Bragg	64,752
Ft. Jackson	21,166
Ft. Gordon	22,663
Ft. Benning	73,655

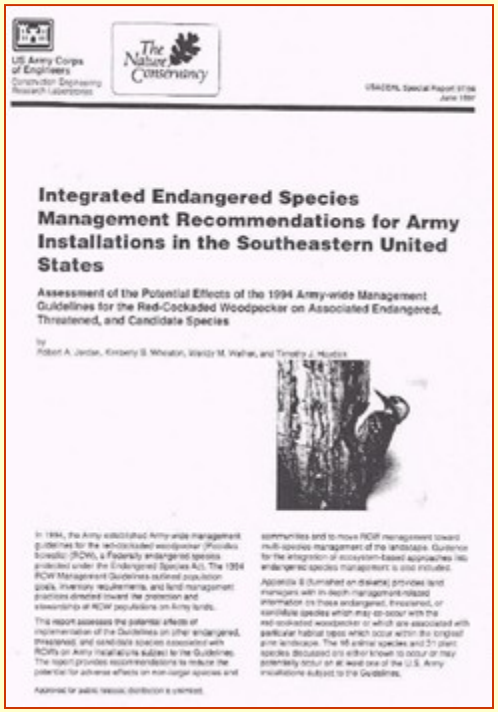
Department of Energ

SRS	80,267

ESA Southeastern Ecological Framework

- **a case study – effects of single species management on other TES**

Red-cockaded woodpecker (*Picoides borealis*)



Integrated Endangered Species Management Recommendations for Army Installations in the Southeastern United States

Assessment of the Potential Effects of the 1994 Army-wide Management Guidelines for the Red-Cockaded Woodpecker on Associated Endangered, Threatened, and Candidate Species

Integrated Endangered Species Management Recommendations for Army Installations in the Southeastern United States. Assessment of the Potential Effects of the 1994 Army-wide Management Guidelines for the Red-Cockaded Woodpecker on Associated Endangered, Threatened, and Candidate

Species of concern known from or potentially occurring on Army installations subject to RCW management guidelines

	E	T	Other	Total
Mammals	3	1	4	8
Birds	6	2	6	14
Reptiles	3	6	5	14
Amphibians	-	-	5	5
Fishes	1	2	2	5
Insects	1	-	6	7
Mollusks	1	-	12	13
Animals	15	11	40	66
Plants	10	1	56	67
TOTAL	25	12	96	133

Proposed actions related to RCW management which are likely to affect other TES species include:

- design and designation of Habitat Management Units
- prescribed burning
- midstory hardwood control
- extractive land uses, including
  - timber harvest and pine straw raking

Endangered, threatened and candidate animal species known from or potentially occurring on selected Army installations which may be affected by RCW management guidelines

Species Name	Common Name	Federal Status[1]	Global Status[1]	State Status[1]
Birds				
Aimophila aestivalis	Bachman's sparrow		G3	S1, S2, S3
Ammodramus helslowii	Henslow's sparrow		G4	SX, S1, S2, S3, S
Lanius ludovicanus	Loggerhead shrike		G4	S2, S3, S4, S5, S
Reptiles				
Drymarchon corais couperi	Eastern indigo snake	T	G4T3	S1, S3, S?
Gopherus polyphemus	Gopher tortoise	T (PS)	G3	S1, S2, S3
Heterodon simus	Southern hognose snake		G2	SH, S2, S?
Pituophis melanoleucus	Northern pine snake		G4T4	S2, S3, S?
Pituophis melanoleucus mugitus	Florida pine snake		G4T3?	S2, S3
Pituophis ruthveni	Louisiana pine snake	C	G3Q	S2S3, S2
Amphibians				
Ambystoma cingulatum	Flatwoods salamander	T	G2G3	S1, S2, S2S3
Hyla andersoni	Pine barrens treefrog		G4	S2, S3, S2S3, SR
Rana capito aesopus	Florida gopher frog		G3T3	S?
Rana capito capito	Carolina gopher frog		G3T3	S2, S?
Rana sevosa	Mississippi gopher frog	E	G1	SH, S1, S2
Insects				
Agrotis sp. 1 nr buchholzi	a dart moth		G2	S2
Atrytone arogos arogos	Arogos skipper		G3G4T1T2	SH, S1, S2, SU
Neonympha mitchellii francisci	Saint Francis' satyr	E	G1G2T1	S1
Spartiniphaga carterae	Carter's noctuid moth		G2G3	S2, S2S3

-after Jordan et al. 1997. USA CERL Special Report 97/94
[1]status from NatureServe 2003

Endangered, threatened and candidate plant species known from or potentially occurring on selected Army installations which may be affected by RCW management guidelines

Species Name	Common Name	Federal Status[1]	Global Status[1]	State Status[1]
Agrimona incisa	Incised groovebur		G3	S1, S2, S3, SR
Amorpha georgiana	Georgia indigo-bush		G3T24	S2, SR
Astragalus michauxii	Sandhills milkvetch		G3	S1, S2, S3, SR, S?
Balduina atropurpurea	Purple balduina		G2	SH, S1, S2, S?
Baptisia arachnifera	Hairy rattleweed	E	G1	S1
Campylopus carolinae	Savanna campylopus		G1G2	S1, S2, S?
Dionea muscipula	Venus flytrap		G3	SE, S1, S3
Eupatorium resinosum	Pine barrens boneset		G3	S2S3, S?
Fimbristylis perpusilla	Harper's fimbristylis		G2	S1, S2
Lilium iridollae	Panhandle lily		G2	S1, S2, SU
Kalmia cuneata	White wicky		G3	S1, S3
Lindera melissifolia	Pondberry	E	G2	SX, SH, S1, S2
Lindera subcoriacea	Bog spicebush		G2	S1, S2, S?, SU
Litsea aestivalis	Pondspice		G3	S1, S2, S3, SR
Lobelia boykinii	Boykin's lobelia		G2G3	S1, S2S3, SR
Lysimachia asperulifolia	Rough-leaf loosestrife	E	G3	S1, S3
Macbridea caroliniana	Carolina bogmint		G2G3	S1, S2, SR, S?
Myriophyllum laxum	Piedmont watermilfoil		G3	S1, S2, S3
Oxypolis canbyi	Canby's dropwort	E	G2	S1, S2
Oxypolis ternata	Savanna cowbane		G3	SH, S1, S2, S3, S?
Parnassia caroliniana	Grass-of-parnassis		G3	S1S2, S2
Plantago sparsiflora	Pineland plantain		G3	S1, S2, S3, S?
Pteroglossaspis ecristata	Crested fringed orchid		G2	S1, S2
Rhexia aristosa	Awned meadowbeauty		G3	S1, S2, S3
Rhus michauxii	Michaux's sumac	E	G2	SX, S1, S2
Rhynchospora crinipes	Hairy-peduncled beakrush		G1	S1
Rudbeckia heliopsidis	Sun-facing coneflower		G2	SH, S1, S2
Sarracenia rubra wherryi	Wherry's pitcher plant		G3T3	S3
Schwalbea americana	American chaffseed	E	G2	SH, S1, S2
Solidago pulchra	Carolina goldonrod		G3	S3, S?
Solidago verna	Spring-flowering goldonrod		G3	S1, S3
Stylisma pickeringii	Pickering's morning glory		G4T2T3	S1, S2
Sporobolus teretifolius	Wireleaf droopseed		G2?	S1, S2?
Thalictrum cooleyi	Cooley's meadowrue	E	G1	S1
Tofieldia glabra	White false asphodel		G3	S3, SR, S?
Xyris scabrifolia	Harper's yellow-eyed grass		G3	S1, S2, S3, S?

-after Jordan et al. 1997. USA CERL Special Report 97/94

[1]status from NatureServe, 2003

Potential effects of RCW management guidelines on animal species known from or potentially occurring on Army installations

Management Practice	Bachman's sparrow	Loggerhead shrike	Gopher tortoise	Indigo Snake	Hognose snake	Pine snake	Flatwoods salamander	Gopher frog
Cavity tree protection	3,2,1	2,1	3	3	3,2,1	3,2,1	3,2,1	3,2,1
Midstory control	1	1	3,2,	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1
prescribed burning	1	1	1 1	1	1	1	3,2,1	1
3-yr return interval	1	1	1	1	1	1	1	1
winter fire	3,2,1	1	3,2,1	3,2,1	3,2,1	3,2,1	3	3,2,1
growing season fire	3,2,1	1	1	3,2,1	3,2,1	3,2,1	1	1
mechanical control	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1
chemical control	3,2,1	2,1	3,2,1	3,2,1	3,2,1	3,2,1	3	3
Fire management	3	2	3	3	3	3	3	3
berm construction	3,2	2	3	3	3,2	3,2	3	3
plowed fire lanes	3,2	2	4	4	4	4	4	4
Extractive use	3	3	3	3	3	3	3	3
pine straw raking	3	2	3	3	3,2	3,2	4	4
timber harvest	3	3	3	3	3	3	3	3
Training	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1	3,2,1
digging restrictions	1	1	1	1	1	1	1	1
small arms firing	2	2	2	2	2	2	2	2
off-road vehicles	3	3	3	3	3	3	3	3

Management effects: 1 = beneficial, 2 = no effect, 3 = may adversely affect, 4 = adverse

Potential effects of RCW management guidelines on plant community types known from or potentially occurring on Army installations

Management Practice	Pine Flatwoods	Pine-oak Woodland/ Xeric Sandhills
Cavity tree protection	3,2	3,2
Midstory control	3,2,1	3,2,1
prescribed burning	1	1
3-yr return interval	1	1 / 4,3
winter fire	3,2	3,2
growing season fire	1	1
mechanical control	3,2,1	3,2,1
chemical control	3,2,1	3,2,1
Fire management	3	3,2
berm construction	4,3	3
plowed fire lanes	4,3	3
Extractive use	4,3	4,3
pine straw raking	4	4
timber harvest	3	3
Training	3,2,1	3,2,1
digging restrictions	1	1
small arms firing	2	2
off-road vehicles	3	3

1 = beneficial, 2 = no effect, 3 = may adversely affect,
4 = adverse

Current research is underway to address the following question:

Is management of longleaf pine woodlands to promote RCW habitat (single species management) on military installations in the Fall Line region beneficial or detrimental to sandhills communities and the suite of TES they contain?

1. *At the landscape level*: To assess whether military training and forest management to promote RCW habitat are appropriate for sandhills communities
2. *At the species population level*: To determine how the combination of forest management practices and military use that is suitable for the sandhills habitat affects individual TES, such as the gopher tortoise and sandhills plant species

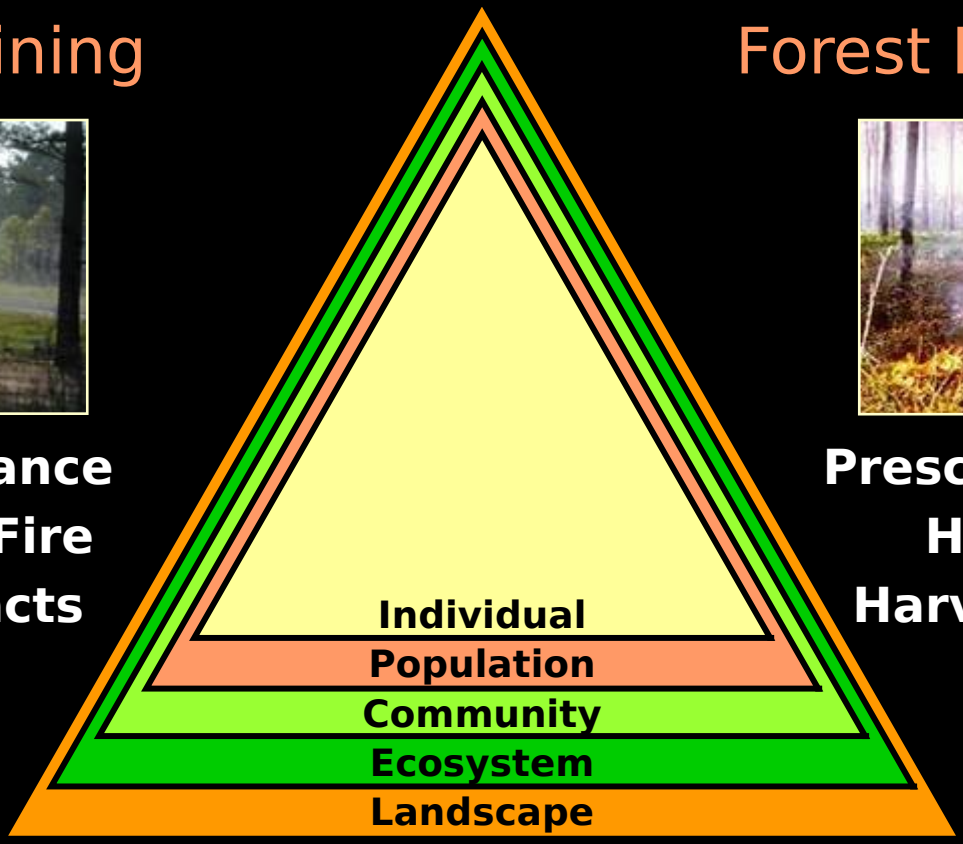
Possible Impacts (+ and -)

Military Training

Soil Disturbance
Accidental Fire
Biotic Impacts

Forest Management

Prescribed Burns
Herbicide
Harvest / Plant



Organizational Scale

- **Questions for consideration:**

1. Should management driven by the needs of one species be the primary process that shapes ecosystem characteristics throughout its range?

2. Can TES species and habitat management be more efficient and more effective at a regional scale?

3. Is it possible to overcome site and agency differences to achieve regional-scale management?